BIBLIOGRAPHY.

Berkeley, M. J. *Septoria rufo-maculans.* Gardeners' Chronicle, 1854, p. 676.
———. *Ascochyta rufo-maculans.* Outlines of British Fungology, 1860, p. 320.
———. *Glœosporium fructigenum.* Gardeners' Chronicle, 1856, p. 245.
———. *Glœosporium lœticolor.* Gardeners' Chronicle, 1859, p. 604.
——— and Curtis, M. A. *Glœosporium versicolor.* Grevillea, Vol. III, p. 13.
Curtiss, G. C. *Treatment of bitter rot of apple.* Section of Vegetable Pathology, U. S. Department of Agriculture, Bulletin 11, p. 38.
Ellis, J. B., and Everhart, B. M. *Glœosporium versicolor,* B. and C. Journal of Mycology, Vol. I, p. 112.
Galloway, B. T. *Bitter rot of the apple.* Annual Report U. S. Department of Agriculture, 1887, p. 248.
———. *Sulphuret of potassium for bitter rot of apples.* Journal of Mycology, Vol. V, p. 37.
———. *Bitter rot of apples.* Section of Vegetable Pathology, U. S. Department of Agriculture, Bulletin 8, p. 61.
———. *Bitter rot of the apple.* Annual Report U. S. Department of Agriculture, 1889, p. 412.
Saccardo, P. A. *Ascochyta rufo-maculans,* Berk. Sylloge, Vol. III, p. 395.
———. *Glœosporium fructigenum,* Berk. Sylloge, Vol. III, p. 718.
———. *Glœosporium lœticolor,* Berk. Sylloge, Vol. III, p. 718.
———. *Glœosporium versicolor,* B. and C. Sylloge, Vol. III, p. 718.
Smith, W. G. *Glœosporium lœticolor,* Berk. Gardeners' Chronicle, 1890, p. 657.
Von Thümen, F. *Glœosoporium rufo-maculans* (Berk.), Thum. Fungi Pomicoli, p. 59.
———. *Glœosporium versicolor,* B. and C. Fungi Pomicoli, p. 60.
———. *Glœosporium lœticolor,* Berk. Die Pilze des Aprikosenbaumes, p. 6.

DESCRIPTION OF PLATE.

FIG. 1. Stroma mass broken through the epidermis. Drawn from specimen, soaked in potash, which caused the ends of the hyphæ to swell and the spores, if there were any, to fall off.
FIG. 2. A later stage. The central part of the stroma mass has begun to break down and spores to form around the circumference.
FIG. 3. Still later stage in the same process.
FIG. 4. Glœosporium form of fungus.
FIG. 5. Spores; three on basidia.
FIG. 6. Setæ.
FIG. 7. Germinating spores; some producing secondary spores on hyphæ.

ANTHRACNOSE OF COTTON.*

PLATES XVII, XVIII.

By GEORGE F. ATKINSON.

While investigating the disease of cotton popularly called "black rust" and "red rust," I found upon an old leaf scar of a cotton stalk a fungus, the spores of which in mass are of a roseate tint. The spores were produced in small clustered heaps, which at length broke through

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to the surface. The fungus resembled very closely members of the genus *Glœosporium*. Farther investigation showed that older specimens possessed olive or dark-brown setæ, intermingled with the colorless basidia. The setæ are proportionately few where the substratum is soft, more numerous when it becomes hard or in the dead or nearly dried parts of the plant, particularly on the stems and the dissepiments of the open boll. The presence of setæ shows the affinity of the fungus with the genus *Colletotrichum*.

On the green bolls the fungus produces depressed spots, at first of a black color, caused by the death of the tissues. If the weather is favorable for the development of numerous spores the dark depressions later assume a grayish or roseate tint from the lesser or greater mass of spores developed. Sometimes the depressions are not well marked, but the fungus being evenly distributed gives a black color to a large portion of the surface of the boll. A severe attack seems to hasten a premature partial opening of the boll, but frequently this checks the growth and the lint can not escape. In such cases the fungus frequently grows also on the lint. Besides these characteristic effects on the boll, the fungus severely injures other parts of the plant. It is a very common accompaniment of *Cercospora gossypina*, Cooke, and other fungi of "black rust" on the leaves, and does much to aggravate that disease. So early as August 12 I found it upon the leaves, and it probably occurred earlier.

The *Colletotrichum* also occasions a very distinct and destructive disease of the cotton plant. A remarkable example of this occurred on the Station farm in some cotton planted in "checks," *i. e.*, in hills with the rows running both ways. The portion of the field attacked was about 2 or 3 acres in extent. During August I noted on my weekly visits that the usual fungi of "black rust" and "red rust" were present, but not sufficient in extent to do any appreciable injury nor to characterize these diseases as they are known to the farmers of Alabama. I found also the *Colletotrichum* principally on the edges of the leaves. In September the *Colletotrichum* severely attacked the stems of the upper part of the plant. The leaves soon appeared, as some expressed it, as if they were affected with a "scald," changing to various shades of yellowish or leaden green color. They soon withered and dried much as if killed by frost, presenting a decidedly different appearance from leaves killed by black rust. The stems became blackened and the death of the plant usually followed.

I have observed the same characteristic disease in several localities around Auburn, but this patch of 2 or 3 acres is the largest I have met with. It is not improbable that in some of the cases reported as "black rust," where in the first stages of the disease it sweeps rapidly and suddenly over certain spots, the *Colletotrichum* is the ultimate factor in causing the death of the plant, and then frequently continues the disease upon the bolls.

Characters of the fungus.—The spores are oblong, usually rather sharply pointed at the base, often rounded at both ends, with a broad shallow constriction in the middle, nearly cylindrical or distinctly curved, sometimes "binucleate." They vary greatly in size from 4.5 to 9μ in diameter by 15 to 20μ in length. Where they are produced on green or decaying bolls, or other softened parts of the plant the distinct acervuli are 100 to 150μ in diameter. On the leaves the acervuli are much smaller and very rarely in sufficient quantity to give the roseate tint. I have found one case of the fungus on a cotyledon of a young plant where the color was distinctly produced. The cotyledons, however, are much more succulent than the leaves. It had also been raining for several days, so that the diseased part could not dry and thus check the profuse development of spores. Many of the spores are borne on scattered fertile hyphæ within the tissues of the leaf, not being collected into distinct clusters. As the tissues of the plant become harder by the partial drying of the leaf the spores produced are fewer in number and borne mainly upon the ends of the setæ.

The setæ are olive or dark brown, straight, curved, flexuous, or rarely branched. They arise from especial bodies, resembling somewhat an imperfect sclerotium, composed of a single dark-brown cell or of a varying number of dark-brown cells, generally a few. When of several cells it is irregular in shape. It is situated within the tissues of the host or projects slightly above the surface or lies along between the cells of the epidermis. When the body consists of a single cell it is produced at the end of a hypha, but is greater in diameter. These single cells may increase to the several-celled sclerotia by a process of growth similar to budding, except that the cells thus formed remain in a closely compact body. The end cells of the setæ are nearly hyaline. The spores borne upon them are often oval, the base being rather sharply pointed. The setæ vary in length from 100 to 250μ. They are usually decidedly shorter on the leaves than on the other parts of the plant. They are in clusters of 5 to 10, or more. Frequently the clusters are so numerous as to make it appear that the setæ are evenly distributed over the substratum.

Artificial cultures.—A number of artificial cultures were made to trace the development of the setæ and the peculiar bodies which bear them. The nutrient medium in most cases was agar peptone broth and an infusion of cotton leaves. Pure cultures were obtained by placing bolls on which the spores were just being produced in a moist chamber. When the cluster of spores was well elevated and distinct, not so old as to be contaminated with bacteria, with a flamed needle a few spores could usually be taken not accompanied by other germs.

The cultures were made in cells. The spores germinated quite freely within 12 to 15 hours, possibly much sooner under favorable conditions. At the time of germination, or prior to it, frequently one or two transverse septa are found in the spore, dividing it into two or three cells.

Several germ tubes may be produced from a single spore. The mycelial threads begin to branch immediately and are somewhat flexuous in their course. From all parts of the mycelium short fertile branches soon arose of 1, 2, or 3 cells' length, which resemble the basidia and produce spores. Sometimes these fertile branches or basidia arise directly from the spore. In the solid medium the spores from a single basidium, when not crowded by the basidia and other spores, are clustered around the end. Each succeeding spore pushing the one which has just become free to one side. The sharply pointed basal end of the spore favors this. After several days there is a beautiful crown cluster of spores about the end of the basidium, all lying parallel to each other. Spores are sometimes produced within 24 hours from the time of sowing.

Besides the production of spores, certain of the branches, either near, or remote from, the center of growth, produce at their ends peculiar enlarged cells, olive brown in color, varying in their outline, but always of greater diameter than the hyphæ which produce them. These bodies frequently produce immediately a normal hypha resembling the others of the mycelium. This in turn may soon produce another special cell, or may grow to considerable length, produce basidia and spores, or as a basidium or fertile hypha direct from the special cell produce spores. In other cases the special cell immediately begins to bud in an irregular manner, producing cells similar in color but very closely compacted into an irregular oval or elongated or flattened imperfect sclerotium. After one or two weeks' growth a large number of these special cells and imperfect sclerotia are produced near the center of growth, *i. e.*, original spore. At the same time the basidia have become very numerous at this point, arising from the mycelium or by the branching of the older ones, and the mass of spores assumes the roseate tint. In several cases I have been able to have the production of the dark-brown setæ borne on these special bodies or cells in the artificial cultures.

Cultures were also started in pure water and in a weak nutrient medium. In water the germ tubes, almost invariably, when once or twice the length of the spore, produced the special cell. If these produced another tube it was only to give rise to another cell of the dark color. In no case were spores produced nor any appreciable length of mycelium. In the weak nutrient medium the special cells were produced freely. Also a number of hyphæ produced one to four or five spores. While the vegetative growth exceeded that of the spores sown in pure water, there was but little compared with the growth in a rich nutrient medium, and the spores did not seem to live long.

These special dark-brown cells, produced soon after germination more freely in weak nutrient media, remind one of secondary spores, but the fact that they are produced in rich nutrient media when ordinary spores are abundant, and especially since they grow by an irregular process of budding to cellular bodies resembling sclerotia, and in both cases

produce setæ, seems to favor the notion that they may serve as peculiar resting bodies produced more abundantly in unfavorable conditions, and later capable of producing mycelia again.

I have observed these same peculiar cells preceding the formation of sclerotia, and intermingled with them in the case of *Vermicularia circinans* on the onion. This is additional testimony regarding the close relationship existing between some of the species of *Colletotrichum* and *Vermicularia*.

Parallel with the artificial cultures, inoculations were made of seedlings grown in a frame. A portion of a boll containing a profuse development of spores was immersed in distilled water which was then shaken thoroughly. The cotyledons of the plantlets were well wetted with this. A bell jar was then placed over them for twenty-four hours. An attempt was then made to imitate as nearly as possible the natural conditions of temperature and humidity, which seem to favor the early development for a few days. By artificial heat temperatures ranging from night to midday, 20° to 35° C. were produced. The humidity of the air in the frame was also kept above that of the open air by keeping the frame closed, having but little ventilation and wetting the soil daily. After the fourth day the humidity was reduced while the temperature was maintained. It was not found necessary to inoculate at incisions in parts of the plant.

A week later an examination was made of a cotyledon which was dying, the distal end being half dead and shriveled while the base was still green. It was well infected, and there were numerous clusters of setæ at the edge, also clusters of spores, and in the interior of the cotyledon spores borne on scattered basidia. Ten days from the time of inoculation another plantlet was diseased, both cotyledons being affected. When the distal half was pretty well dead and shriveled the examination was made. Very few external signs of the fungus were present, but in a few places at the edge the setæ were just piercing through, and sections showed numerous spores and clusters of the special bodies which bear the setæ. The base of each cotyledon was apparently healthy and each was still firmly attached to the stem.

I have not yet attempted to inoculate the plants in any other way than through the cotyledons, but the success attained has suggested that perhaps the plants when not injured in any way are only liable to infection through the cotyledons as in the well-known cases of *Cystopus candidus* in different species of *Cruciferæ*. How far this is true must be determined by future experiments.

The *Colletotrichum* on cotton seems to have been hitherto an undescribed species. Since completing this work thus far I found that Miss E. A. Southworth had been giving the fungus some study, having had specimens of it on cotton bolls. She has proposed the name *Colletotrichum gossypii*, n. sp., which is eminently appropriate.

DESCRIPTION OF PLATE.

Fig. 1. Spores showing variation in shape and size.
2. Spores germinating in artificial cultures.
3. Farther development.
4, 5, 6, 7. Spores germinating and some of the hyphæ producing the dark-brown cells.
8. Spores germinating in pure water, producing immediately the special cells.
9. Spores germinating in weak nutrient medium producing special cells and a few spores.
10. Same.
11. Growth from one spore in rich nutrient medium 65 hours from time of sowing, showing crown clusters of spores around ends of fertile hyphæ; one of the special cells by budding has produced an imperfect sclerotium.
12. Ends of hyphæ in an old culture showing special cells and one seta.
13. Section through acervuli on boll.
14. Same, more highly magnified.
15. Section from stem showing special cells and imperfect sclerotia and origin of setæ.
16. Peculiar enlarged cells from a cluster.
17. Setæ from old specimens on dried part of boll.
18. Setæ from leaf.
19. Young setæ from cotyledon of one of the plants inoculated with spores from a boll.

Figs. 2–12. From artificial cultures, 13 to 18 from natural specimens, 19 from inoculation.

All excepting 13 drawn to the same scale with aid of camera lucida. Fig. 13 drawn with aid of camera lucida to smaller scale.

MYCOLOGICAL NOTES II.

PLATE VII.

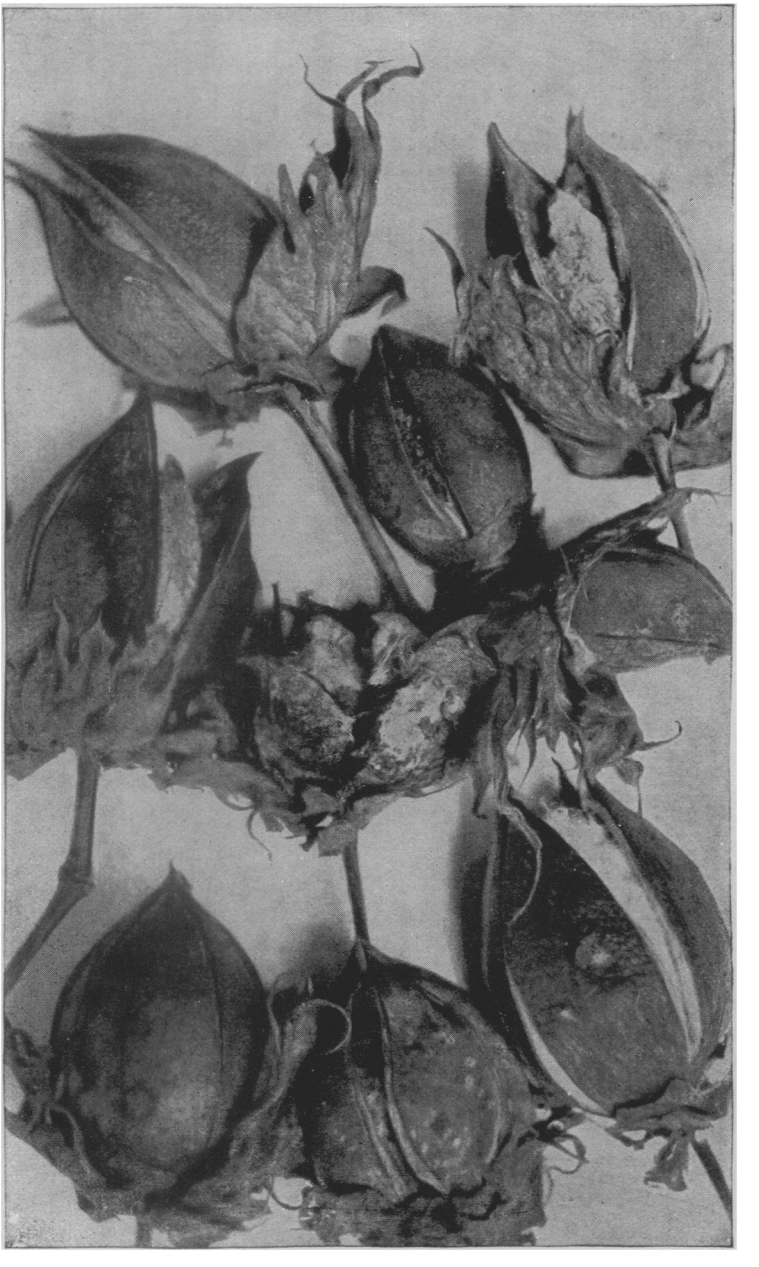
By GEORGE MASSEE.

SARCOMYCES, Mass., (*nov. gen.*)

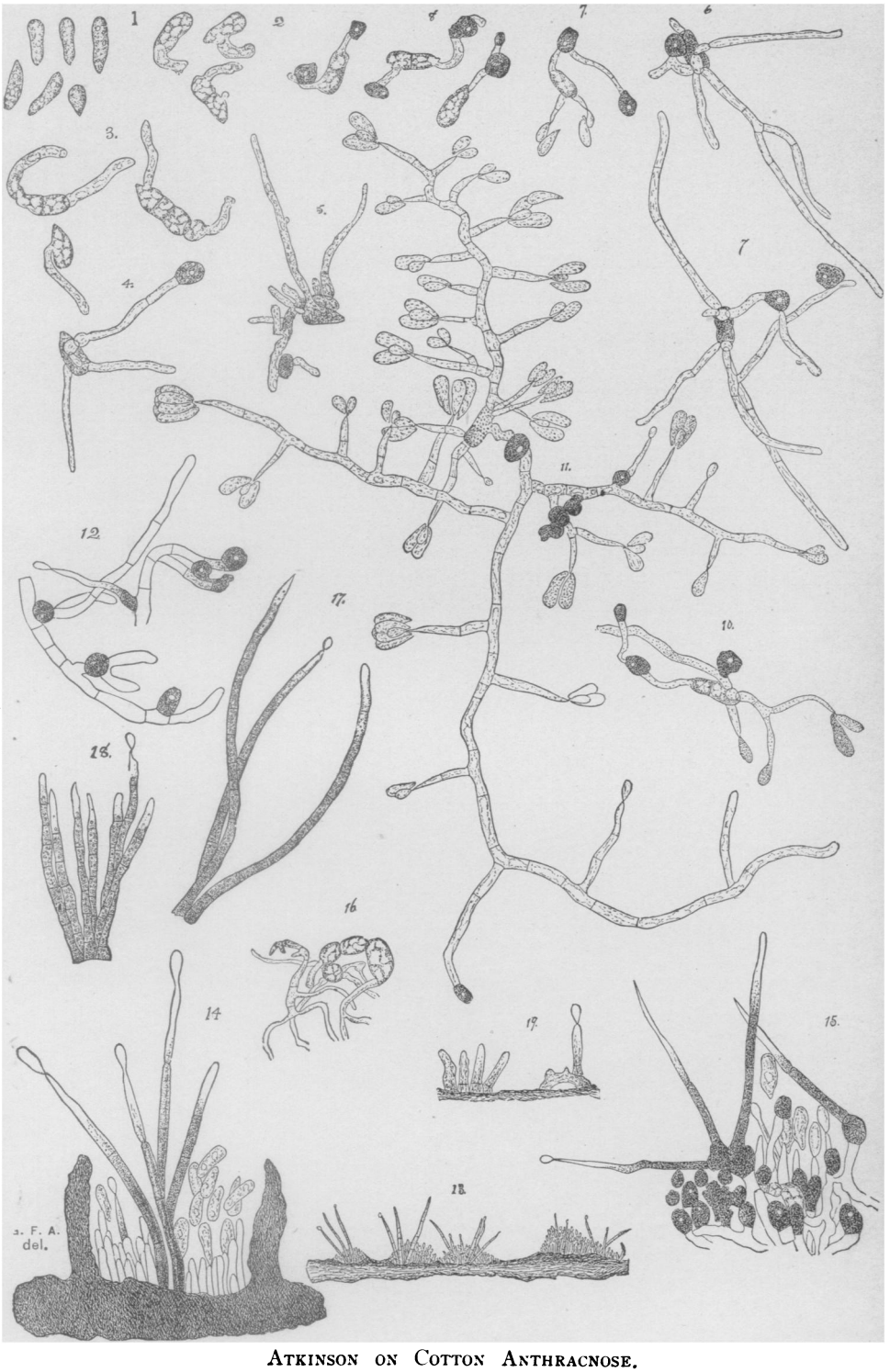
Receptacle subgelatinous, subsessile, erumpent, attached by a narrow base; hymenium convex, even, margin acute; asci cylindrical; spores uniseriate, colored, muriformly septate; paraphyses numerous.

Allied to *Hæmatomyxa*, Sacc., but distinguished by the even marginate hymenium and the uniseriate spores. It is doubtful whether the last-named genus really belongs to the *Bulgarieæ*.

SARCOMYCES VINOSA, Mass. (Figs. 1–3.) Erumpent; substipitate, expanding into a more or less circular fleshy disk, plane or convex below, margin acute, patent when moist, incurved when dry; hymenium convex, even, every part perfectly glabrous and dark purple-brown; asci cylindrical, attenuated and usually curved at the base; spores uniseriate, four in an ascus, elliptical, ends subacute, usually rather oblique, at first triseptate then with septa formed parallel to the long axis of the spore, slightly or not at all constricted at the septa, clear brown,



ATKINSON ON COTTON ANTHRACNOSE.



ATKINSON ON COTTON ANTHRACNOSE.

21–24 by 8–10μ; paraphyses linear, colorless, not incrassated at the tips, aseptate, equal in length to the asci, very numerous, 2–5μ thick.

Tremella vinosa, Berk. & Curt., in Herb. Berk. On wood. Venezuela; S. Carolina, Rav. Type in Herb. Berk., Kew, No. 4285.

From two-thirds to 1 inch across, solitary, or 2–3 in clusters, subgelatinous when moist, cartilaginous and much contracted when dry. With very much the habit and general appearance of *Bulgaria inquinans*, but of a dark purple color.

PEZIZA PROTRUSA, B. & C. (Figs. 8 to 11.) Hypophyllous, gregarious, erumpent, bordered by the torn, upraised cuticle; hymenium plane or concave, whitish, hypothecium very thin; margin of cup slightly raised, composed of parallel septate hyphæ, each terminated by a large, olive-brown cell; asci subcylindrical, 55–60 by 5–6 μ; spores irregularly biseriate, cylindrical, tips obtuse, smooth, colorless, 5–6 by 1.5μ, paraphyses absent.

Peziza protrusa, B. & C., Grev., Vol. III, p. 159.

Pseudopeziza protrusa, (B. & C.) Rehm, Ascom. No. 310. Sacc. Syll. VIII, No. 2980.

Pyrenopeziza protrusa, (B. & C.) Sacc. Syll. VIII, No. 1503. (Type in Herb. Berk., Kew, No. 7815.)

On the leaves of *Magnolia glauca*, Lower Carolina. Gregarious, rarely crowded, up to 0.5 millimetre in diameter. I have not been able to detect paraphyses in the specimen examined. Usually circular and patellate, the irregularity of the opening being due to the mode of rupture of the epidermis.

STAMNARIA PUSIO, (B. & C.) Mass. (Figs. 16–18.) In clusters of 2–3 from a common stem, every part horny and translucent when dry; cups urceolate or subglobose; mouth contracted, externally smooth, even, grayish, or horn colored; hymenium concave, orange, asci cylindrical, slightly narrower at base; spores 8, uniseriate, elliptic-oblong, smooth, colorless, 15 by 7–8μ; paraphyses numerous, linear, septate; the cups pass downward into slender stems which combine to form a thickened, root-like portion.

Peziza pusio, B. & C., Grev., Vol. III, p. 153; Cke., Mycogr. 106.

Sarcoscypha pusio, Sacc. Syll., Vol. VIII, No. 624. (Type in Herb. Berk., Kew, No. 7451.) On the ground. Texas. (C. Wright.)

The whole fungus 1 inch or more high; substance hard and horny when dry; hyphæ thick-walled, densely interlaced, the walls becoming gelatinous and cemented together.

PSILOPEZIA MIRABILIS, B. & C., Journ. Linn. Soc., Vol. X, p. 364; Sacc. Syll., Vol. VIII, No. 616, is synonymous with *Aleurodiscus Oakesii*. Type in Herb. Berk., No. 7402.

CYPHELLA TELA, (B. & C.) Mass. (Figs. 12, 13.)

Gregarious on a dense white subiculum; cups minute, 150–180μ diameter, subglobose; mouth at first small, becoming expanded, but the acute margin always remains more or less incurved; externally

blackish brown, frosted with glistening crystals of oxalate of lime; hymenium concave, even, naked, blackish brown; basidia clavate, tetrasperous; spores subglobose or broadly pyriform, smooth, pale brown, 7 by 5μ.

Peziza tela, Berk. & Curt., Grev., Vol. III, p. 156 (1875).

Tapesia tela, (B. & C.) Sacc., Syll. Vol. VIII, No. 1539.

On wood. Lower Carolina. (Type in Herb. Berk., Kew, No. 7724.)

The present species, owing to its dark color and gregarious habit, also being furnished with a dense, white, broadly effused, superficial mycelium, suggests the genus *Peziza* when examined under a low power, but is a true *Cyphella*.

DACRYOPSIS, Mass., (*nov. gen.*)

Small subgelatinous fungi, fertile portion capitate, sharply defined, terminal on a more or less elongated stem composed of parallel, simple or branched septate hyphæ; at the apex of the stem the hyphæ are very much interlaced, forming a compact expanded layer from which originates in the first instance numerous slender gonidiophores spreading on every side to form a more or less capitate head; gonidia minute, one-celled, forming a dense layer; basidia cylindrical, bifurcate, aseptate, springing from the interlaced layer of hyphæ at the apex of the stem, either contemporaneous with, or later than, the gonidiophores; spores simple or septate.

Coryne, Berk., Grev. Vol. II, p. 33 (in part).

Ditiola, Berk., Ann. Nat. Hist., Ser. 2, Vol. II, p. 267, Pl. IX, Fig. 4.

Tremella, Sacc. Syll. Vol. VI, p. 780 (in part).

Coryne, Sacc. Syll. Vol. VIII, p. 641 (in part).

During the gonidial stage the structure is identical with that of the form-genus *Tubercularia*, the stem is often more elongated than in the last-named genus, but in *Dacryopsis nuda* even this unimportant difference disappears. The basidia and spores closely resemble those met with in *Dacryomyces*, to which genus the present is closely allied, differing in the structure of the stem and in the arrangement and form of the gonidiophores.

The gonidial phase of *Dacryopsis nuda* is morphologically almost indistinguishable from the form species known as *Tubercularia vulgaris*, Tode, but it is well known that the latter is the gonidial condition of the ascigerous fungus called *Nectria cinnabarina*, Fr., hence it is seen that two structures almost indistinguishable in the gonidial form may be conditions of ascomycetous and basidiomycetous fungi, respectively. Again, it is known that the gonidial condition of various species of *Nectria* belongs to such morphologically distinct form genera as *Tubercularia*, *Fusarium*, *Volutella*, etc., consequently it appears to be at least indiscreet to assume, much more to assert, that because a gonidial form presenting certain morphological features has been clearly proved to be a condition of some higher fungus belonging to a given genus that

another gonidial form of similar structure must necessarily be a condition of some hypothetical species of the same genus. Such assumptions do not harmonize with the stated belief of those mycologists who consider that a complete life history is necessary to prove relationship or otherwise in suspected cases, a belief that has brought conviction to the mind of most disciples of the Friesian school, whose conceptions of affinity are based on characters derived from mature examples, which in many instances are of no genetic value. On the other hand, it is to be regretted that the modern school, having adopted the only known reliable test of affinity—life history—should endeavor to indicate affinity from analogy to such an extent as is too frequently done. The close morphological agreement between the gonidial condition in the present genus and in *Coryne* further illustrates the same idea.

DACRYOPSIS GYROCEPHALA, Mass. (Figs. 4–7.) Gregarious or scattered; head hemispherical, plane below, with ridges arranged in a gyrose manner, dark purple, blackish purple when dry; stem equal or slightly incrassate above, smooth, even, pale, tan-colored, 2–3.5 millimetres long, about 1.5 millimetre thick; gonidiophores covering every part of the head, simple, aseptate, straight, 40–50 by 1.5μ; gonidia terminal continuous, colorless, elliptic-oblong, 2.5 by 1μ; basidia projecting beyond the gonidiophores, aseptate, cylindrical, bifurcate near the apex, 60–65 by 6–7μ; spores continuous, colorless, elliptic-oblong, slightly curved, with an oblique apiculus at the base, 15–16 by 4–4.5μ; clavate paraphyses numerous, shorter than the gonidiophores.

Tremella (*Coryne*) *gyrocephala*, B. & C., Grev., Vol. II, p. 20 (1873). Sacc. Syll., Vol. VIII, No. 2654. (Type in Herb. Berk., Kew.) Lower Carolina. Gregarious, on rotten wood.

The stem attains its full size before the development of the head commences, the latter is at first small and even, but as it increases in size becomes gyrose as in many species of *Tremella* and *Dacryomyces*.

In old specimens the gonidiophores have fallen away, leaving only the basidia and paraphyses.

DACRYOPSIS ELLISINA, Mass. (Figs. 19–21.) Gregarious, head broadly elliptical or elliptic-oblong, smooth, even, pale brown, 4–6 by 2–4 millimetres, stem cylindrical, longitudinally wrinkled, 3–4 by 1.5–2 millimetres, dark brown; gonidiophores covering the entire head, straight, septate, with 1–3 short branchlets near the apex, 40–50 by 2.5μ; gonidia continuous, colorless, elliptic-oblong, very slightly curved, 3 by 1μ; basidia cylindrical, bifurcate at the apex, aseptate, 50–55 by 6μ; spores elliptic-oblong, with an oblique apiculus at the base, 14 by 5μ.

Coryne Ellisii Berk., Grev., Vol. II, p. 33; Sacc. Syll., Vol. VIII, No. 2655. Potsdam, New York. (Ellis.) On decaying basswood log. (Type in Herb. Berk., Kew.)

DACRYOPSIS UNICOLOR, Mass. (Figs. 22–24.) Gregarious; entire fungus, blackish brown; head globose, small, smooth, even, 1.5–2 millimetres diameter; stem elongated, erect, slightly attenuated upwards,

vaguely longitudinally rugulose, 5–8 by 1–1.5 millimetres; gonidiophores covering every portion of the head, linear, curved, septate, with a few short lateral branchlets, 70–80 by 1.5μ; gonidia elliptic-oblong, continuous, colorless, 3–1μ; basidia appearing after the gonidiophores, aseptate, bifurcate at the apex, 45–50 by 5–6μ; spores continuous, colorless, elliptic-oblong, with an oblique apiculus at the base, 15 by 4–4.5μ.

Coryne unicolor, B. & Curt. Type in Herb. Berk., Kew, No. 4310. On rotten wood, Cuba. (Wright.)

I have not seen any previous description of the present species; possibly such may exist along with others of the same genus in some American publication.

DACRYOPSIS NUDA, Mass. (Figs. 25–26.) Gregarious; head hemispherical, flattened below, at first even, then minutely rugulose, reddish orange, 3–4 millimetres diameter; stem short, stout, equal, white, or tinged with yellow, minutely tomentose, 3–4 by 2–2.5 millimetres, even; gondiophores appearing before the basidia, linear, straight, aseptate, simple, or rarely with one or two short branchlets near the apex, 35–40 by 1.5μ; gonidia elliptic-oblong, continuous, colorless, 3 by 1μ; basidia projecting considerably above the gonidiophores, cylindrical, bifurcate at the apex, 55–60 by 5–6μ; spores elliptic-oblong, colorless, with an oblique apiculus at the base, triseptate, 14 by 5μ.

Ditiola nuda, Berk. Ann. Nat. Hist., Ser. II, Vol. II, p. 267, Pl. IX, Fig. 4 (Berkeley's No., 375). Britain. On fir stumps.

Closely resembling in general appearance *Tubercularia cinnabarina*, but quite distinct morphologically.

DACRYOMYCES ENATA, (B. & C.), Mass. (Figs. 14, 15.) Erumpent; dark amber, appressed, surface slightly rugulose or almost smooth, bounded by the ruptured bark, up to 1 centimetre diameter; basidia cylindrical, bifurcate at the apex, 45–50 by 5μ; spores elliptic-oblong, colorless, with an oblique apiculus at the base, slightly curved, 10–11 by 3.5μ.

Tremella enata, Berk. & Curt., Grev., Vol. II, p. 20; Sacc. Syll., Vol. VI, No. 8424. Superficially resembling a small discolored form of *Tremella albida*, but a true *Dacryomyces*. From 3 millimetres to 1 centimetre across. Type in Herb. Berk., Kew, No. 4307. On *Alnus serrulata* and oak, lower Carolina.

TREMELLA VESICARIA, Bull.=*Peziza concrescens*, Schweinitz. (Specimens from Schweinitz in Herb. Berk.)

TREMELLA GIGANTEA, B. & C., Grev., Vol. II, p. 19. Alabama. (Peters.) The present species is a gelatinous lichen. Type in Herb. Berk., Kew, No. 4260.

TREMELLA MYRICÆ, Berk. & Cooke. Foliaceo-gyrose, gelatinoso-elastic, semipellucid, smoky gray, when dry blackish with a tinge of purple here and there, surface with minute, scattered points; spores broadly elliptical, with an oblique apiculus, 8–9 by 6–7μ, colorless.

Tremella myricæ, Berk. & Cke., Grev., VI, p. 133; Sacc. Syll., VI, No. 8422. On bark of *Myrica* and *Persea*, Gainesville, Fla. (Rav.). (Type in Herb. Berk., Kew, No. 4300.)

Forming thin, foliaceous expansions when dry, 1–4 centimetres across. The minutely scabrid surface when dry is characteristic.

DACRYMYCES SYRINGICOLA, B. & C. Erumpent, pale or slightly convex, surface almost even or tuberculated, watery gray or whitish, surrounded by the ruptured epidermis; basidia large, spherical, with four stout, elongated sterigmata, spores colorless, cylindric-oblong, curved, with an oblique apiculus at the base, 32–35 by 8–9μ.

Dacrymyces syringicola, B. & C., Grev., Vol. II, p. 20; Sacc. Syll., VI, No. 8504.

Dacrymyces destructor, B. & C., Grev., Vol. II, p. 20; Sacc., Syll. VI, No. 8505. Both types in Herb. Berk., Kew., Nos. 4324 and 4328.

On *Syringa* and on branches of pear, to which it is very destructive, lower Carolina. Rav.

The only distinction between the two species, as pointed out by Berkeley, depends on the amount of tuberculation of the surface, and even this is not constant. The furcate spores alluded to by Berkley are portions of the septate hyphæ that have become free. Circular or elliptical, often numerous, 3–4 millimetres across, resembling lenticels when dry and contracted.

TREMELLA DEPENDENS, B. & C. Pendulous, elongato-clavate, attached by a slender stem-like base, mucilaginous, pale dingy yellow; the central portion consisting of exceedingly thin hyphæ immersed in mucilage; towards the even surface the hyphæ become thicker and form a compact layer which produces basidia at every part of the surface; basidia spherical with four elongated sterigmata; spores elliptic-oblong, smooth, colorless, 7 by 3–3.5 μ.

Tremella dependens, B. & C., Grev., Vol. II, p.19; Sacc. Syll., Vol. VI, No. 8396. Hanging down from under side of rotten poplar (*Liriodendron*) logs after rain, Alabama. Peters.

The following note accompanied the specimens:

"Sack-like, elongated, round, subclavate, subtranslucent, thin, watery, mucilaginous, dissolving when the thin outer skin is broken, pale, watery, greenish-yellow, $\frac{1}{8}$–1 inch long." The green tinge is due to minute algæ.

TREMELLA RUFO LUTEA, B. & C. A very remarkable form, attached laterally by a broad base, imbricated, resembling *Stereum hirsutum* in habit; more or less reniform or semicircular, margin sometimes lobed, yellow brown or amber, translucent when moist, upper surface irregularly nodulose and with a tendency to form concentric zones due to the arrangement of the nodules, under surface almost smooth; substance thick, very cartilaginous, central portion composed of much-branched hyphæ with thick gelatinous walls; toward the outside, above and below, the hyphæ are dense and parallel, but showing no trace of

differentiation into basidia or gonidiophores. From 4–6 by 3–4 centimetres, and 3–4 milimetres thick at the base, thinner toward the margin. Every portion perfectly smooth. Berkeley's remark "uno puncto affixa," must have been a slip of the pen.

Tremella rufo-lutea, B. & C., Journ. Linn. Soc., 1869, Vol. x, p. 340; Sacc. Syll., Vol. VI, No. 8394.

DESCRIPTION OF PLATE.

1. *Sarcomyces vinosa*, section, natural size.
2, 3. Ascus, spores, and paraphyses of same, X 400.
4. *Dacryopsis gyrocephala*, natural size.
5. Same, X 6.
6, 7. Portion of hymenium and spores of same, X 400.
8. *Peziza protrusa*, X 75.
9. Portion of hymenium and margin of same in section, X 400.
10. Asci and spores of same, X 400.
11. Spores of same, X 1,200.
12. *Cyphella tela*, X 75.
13. Portion of hymenium of same, X 400.
14. *Dacryomyces enata*, natural size.
15. Spores of same, X 400.
16. *Stamnaria pusio*, natural size.
17, 18. Ascus, paraphyses, and spores of same, X 400.
19. *Dacryopsis Ellisiana*, natural size.
20. Section of portion of hymenium of same, X 400.
21. Gonidiophores and gonidia of same, X 1,200.
22. *Dacryopsis unicolor*, natural size.
23. Gonidiophores and gonidia of same, X 1,200.
24. Spores of same, X 400.
25. *Dacryopsis nuda*, natural size.
26. Section of portion of hymenium of same, X 400.

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177. ANDERSON, F. W. **Biographical sketch of J. B. Ellis.** Bot. Gaz. Crawfordsville, Indiana, Vol. XV, No. 11, November, 1890, pp. 299–304. Gives an account of the life of this pioneer of North American Mycology.

178. BAILEY, L. H. **Peaches and yellows in the Chesapeake country.** American Garden, New York, January, 1891, Vol. XII, No. 1, pp. 20–23. Describes conditions of the disease in Maryland and Delaware. Refers to late investigations of the Division of Vegetable Pathology, showing disease to be of contagious nature not affected by fertilizers.

179. ———. **The peach yellows.** Bull. XXV., Cornell Agr. Ex. Sta. Ithaca, New York, December, 1890, pp. 178–180. Gives account of work of Dr. Erwin F. Smith, of the Department of Agriculture, upon the disease, with note as to the New York State law in regard to the matter.

180. BESSEY, CHAS. E. **An old botanical letter.** Am. Nat., December, 1890, Vol. XXIV, No. 288, p. 1196. Gives verbatim copy of a letter written by C. H. Persoon to Sowerby, from Göttingen, May 2, 1801, alluding to the latter's "English Fungi."